

STRUCTURE OF JOINED CHANNEL-SHAPED PLATES

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to Japanese Patent Application No. 2020-3773 filed on Jan. 14, 2020, the contents of which are hereby incorporated by reference into the present application.

TECHNICAL FIELD

[0002] The technique disclosed herein relates to a structure of joined ends of two channel-shaped plates. Each of these channel-shaped plates is a beam comprising an elongated main plate, and upper and lower flanges that are provided respectively at both ends of the main plate and extend in the same direction. In other words, the channel-shaped plates are angular U-shaped beams. It should be noted that the terms “upper” and “lower” in the upper flange and the lower flange are used merely to distinguish the two flanges each other, thus the upper flange may not necessarily be positioned above the lower flange. The upper flange and the lower flange may be at the same height level.

BACKGROUND

[0003] Frames of a vehicle, such as a side member, a crossmember, and a rocker (side sill), are often configured of angular tubes. Such angular tubes are described in Japanese Patent Application Publication Nos. 2012-096718 and H8-268340, for example. As exemplified in Japanese Patent Application Publication No. H8-268340, an angular tube is formed by jointing two channel-shaped plates facing each other.

SUMMARY

[0004] Ends of two channel-shaped plates may be joined to each other. The disclosure herein provides a technique that provides increased strength to a jointed site of ends of two channel-shaped plates.

[0005] The disclosure herein discloses a structure of jointed ends of two channel-shaped plates (first and second channel-shaped plates). The first channel-shaped plate may comprise a first main plate, a first upper flange, and a first lower flange. The second channel-shaped plate may comprise a second main plate, a second upper flange, and a second lower flange. The structure disclosed herein may further comprise a reinforcement plate. Hereinbelow, a longitudinal direction of the main plates of these channel-shaped plates will be referred to simply as a longitudinal direction.

[0006] The first channel-shaped plate may include a first extension at an end thereof. The first extension extends from the first lower flange and a lower part of the first main plate, and extends in the longitudinal direction. The second channel-shaped plate may include a second extension at an end thereof. The second extension extends from the second upper flange and an upper part of the second main plate, and extends in the longitudinal direction. The end of the first channel-shaped plate and the end of the second channel-shaped plate may be assembled and joined such that the first extension is located outside the second channel-shaped plate and the second extension is located outside the first channel-

shaped plate. The reinforcement plate may be joined to both of the first main plate and the second main plate.

[0007] In the above structure, the first extension of the first channel-shaped plate and the second extension of the second channel-shaped plate are adjacent to each other along an up-down direction, and the reinforcement plate is joined thereto. Thus, the structure can provide increased strength to the jointed site of the two channel-shaped plates.

[0008] Details and further improvements of the technique disclosed herein will be described in Detailed Description below.

BRIEF DESCRIPTION OF DRAWINGS

[0009] FIG. 1 is a perspective view for a first channel-shaped plate, a second channel-shaped plate, and a reinforcement plate in disassembled state.

[0010] FIG. 2 is a perspective view for the first channel-shaped plate, the second channel-shaped plate, and the reinforcement plate in disassembled state (viewed from a different angle).

[0011] FIG. 3 is a perspective view for the first channel-shaped plate and the second channel-shaped plate in assembled state.

[0012] FIG. 4 is a perspective view for the first channel-shaped plate and the second channel-shaped plate in assembled state (viewed from a different angle).

[0013] FIG. 5 is a perspective view for the first channel-shaped plate and the second channel-shaped plate in assembled state with the reinforcement plate joined.

[0014] FIG. 6 is a plan view for the first channel-shaped plate and the second channel-shaped plate in assembled state with the reinforcement plate joined.

[0015] FIG. 7 is a perspective view for the first channel-shaped plate and the second channel-shaped plate disassembled in an up-down direction.

[0016] FIG. 8 is a perspective view for a vehicle frame with a structure of an embodiment.

[0017] FIG. 9 is a perspective view for a first channel-shaped plate and a second channel-shaped plate in disassembled state according to a variant.

DETAILED DESCRIPTION

[0018] A structure 2 according to an embodiment will be described with reference to the drawings. The structure 2 is a structure of joined two channel-shaped plates (a first channel-shaped plate 10 and a second channel-shaped plate 20). A channel-shaped plate means a beam in which flanges are provided on both widthwise edges of an elongated main plate, respectively. The flanges are provided at the same side of the main plate, such that they face each other. For convenience sake, one of the flanges will be termed an upper flange and the other of the flanges will be termed a lower flange. FIG. 1 shows only vicinities of one end of the first channel-shaped plate 10 and one end of the second channel-shaped plate 20, and omits showing other ends of the first channel-shaped plate 10 and the second channel-shaped plate 20.

[0019] In the drawings, an X direction in the coordinate system corresponds to a longitudinal direction of main plates 11, 21, and +Z direction in the coordinate system corresponds to an up direction. As mentioned, “upper” is defined merely for convenience of explanation, thus the +Z direction may correspond to a down direction or a lateral direction.